

Patent claims

1. A fusion protein composed of a wild-type IL-15 and an IgG Fc fragment, with the exception of a murine IgG2b Fc fragment.
5
2. A fusion protein as claimed in claim 1, characterized in that the IgG Fc fragment is a human or murine IgG1, a human IgG2, a murine IgG2a, a human or murine IgG3 or a human IgG4.
10
3. A fusion protein as claimed in claim 1 or 2 which contains the amino acid sequence SEQ ID NO:1 or an allelic variant thereof.
15
4. A fusion protein as claimed in claim 1 or 2 which contains the amino acid sequence SEQ ID NO:2 or an allelic variant thereof.
- 20 5. A fusion protein as claimed in claim 1 or 2 which contains the amino acid sequence SEQ ID NO:3 or an allelic variant thereof.
- 25 6. A fusion protein as claimed in claim 1 or 2 which contains the amino acid sequence SEQ ID NO:4 or an allelic variant thereof.
- 30 7. A fusion protein as claimed in claim 1 or 2 which contains the amino acid sequence SEQ ID NO:5 or an allelic variant thereof.
8. A nucleic acid which encodes a fusion protein as claimed in at least one of claims 1 to 7.
- 35 9. A nucleic acid as claimed in claim 8 which contains the DNA sequence SEQ ID NO:6 or an allelic variant thereof.

10. A nucleic acid as claimed in claim 8 which contains the DNA sequence SEQ ID NO:7 or an allelic variant thereof.
- 5 11. A nucleic acid as claimed in claim 8 which contains the DNA sequence SEQ ID NO:8 or an allelic variant thereof.
- 10 12. A nucleic acid as claimed in claim 8 which contains the DNA sequence SEQ ID NO:9 or an allelic variant thereof.
- 15 13. A nucleic acid as claimed in claim 8 which contains the DNA sequence SEQ ID NO:10 or an allelic variant thereof.
- 20 14. A fusion protein which is encoded by a nucleic acid as claimed in one of claims 9-13.
- 25 15. A vector which contains at least one nucleic acid as claimed in at least one of claims 8 to 14.
- 30 16. A cell which contains at least one nucleic acid as claimed in at least one of claims 8 to 14 and/or at least one vector as claimed in claim 15.
- 35 17. A cell as claimed in claim 16, characterized in that the cell is a stem cell, a precursor cell and/or an immortalized cell.
18. A cell as claimed in claim 17, characterized in that the cell is a pluripotent or multipotent embryonic, fetal, neonatal or adult stem cell.
19. A cell as claimed in at least one of claims 16 to 18 in the form of a cell line.

20. A pharmaceutical which comprises at least one fusion protein as claimed in one of claims 1 to 7 and 14, at least one nucleic acid as claimed in one of claims 8 to 13, at least one vector as claimed in claim 15 and/or at least one cell as claimed in one of claims 16 to 18, and suitable auxiliary substances and/or additives.
21. A human or animal organospecific tissue and/or human or animal mammalian organ which comprises at least one fusion protein, in particular as claimed in one of claims 1-7 and 14, at least one nucleic acid encoding said fusion protein, in particular as claimed in one of claims 8-13, at least one vector containing at least one said nucleic acid, in particular as claimed in claim 15, and/or at least one cell, in particular as claimed in one of claims 16-18, comprising at least one said nucleic acid and/or at least one said vector, with the fusion protein containing a wild-type IL-15 and an Fc fragment.
22. A transgenic nonhuman mammal which comprises at least one fusion protein, in particular as claimed in one of claims 1-7 and 14, at least one nucleic acid encoding said fusion protein, in particular as claimed in one of claims 8-13, at least one vector, in particular as claimed in claim 15, containing at least one said nucleic acid and/or at least one cell, in particular as claimed in one of claims 16-18, comprising at least one said nucleic acid and/or at least one said vector, with the fusion protein containing a wild-type IL-15 and an Fc fragment.
23. The use of a fusion protein, in particular as

5 claimed in one of claims 1-7 and 14, of a nucleic acid, in particular as claimed in one of claims 8-13, of a vector, in particular as claimed in claim 15, and/or of a cell, in particular as claimed in one of claims 16-18, with the fusion protein containing a wild-type IL-15 and an Fc fragment, or of a human or animal organospecific tissue and/or of a human or animal mammalian organ as claimed in claim 21, for producing a medicament
10 for inhibiting an IL-15-mediated cellular event.

24. The use of a fusion protein, in particular as claimed in one of claims 1-7 and 14, of a nucleic acid, in particular as claimed in one of claims 8-13, of a vector, in particular as claimed in claim 15, and/or of a cell, in particular as claimed in one of claims 16-18, with the fusion protein containing a wild-type IL-15 and an Fc fragment, or of a human or animal organospecific tissue and/or of a human or animal mammalian organ as claimed in claim 21, for producing a medicament
15 for inhibiting the interaction of an IL-15 with its receptor.

25 25. The use of a fusion protein, in particular as claimed in one of claims 1-7 and 14, of a nucleic acid, in particular as claimed in one of claims 8-13, of a vector, in particular as claimed in claim 15, and/or of a cell, in particular as claimed in one of claims 16-18, with the fusion protein containing a wild-type IL-15 and an Fc fragment, for producing a medicament for lysing cells which are expressing an IL-15 receptor.
30

35 26. The use of a fusion protein, in particular as claimed in one of claims 1-7 and 14, of a nucleic acid, in particular as claimed in one of claims 8-

13, of a vector, in particular as claimed in claim
15, and/or of a cell, in particular as claimed in
one of claims 16-18, with the fusion protein
containing a wild-type IL-15 and an Fc fragment,
5 or of a human or animal organospecific tissue
and/or of a human or animal mammalian organ as
claimed in claim 21, for producing a medicament
for the prophylaxis and/or therapy of
transplantation sequelae and/or autoimmune
10 diseases.

27. The use of a human or animal organospecific tissue
and/or a human or animal mammalian organ as
claimed in claim 21 for transplantation into a
15 human or animal mammal.

28. The use as claimed in claim 27, characterized in
that the transplantation is an
autotransplantation, an allotransplantation or a
20 xenotransplantation.

29. A process for preparing a fusion protein as
claimed in at least one of claims 1 to 7 and 14,
comprising the following steps:

25 a. Introducing at least one nucleic acid as claimed
in one of claims 8 to 13 and/or at least one
vector as claimed in claim 15 into a cell, and

30 b. expressing the nucleic acid under suitable
conditions.

30. An *in-vitro* process for preparing a human or
animal organospecific tissue and/or a human or
35 animal mammalian organ as claimed in claim 21,
comprising the following steps:

- 55 -

- 5 a. Introducing, into at least one stem cell, one precursor cell and/or one immortalized cell of a human or animal organospecific tissue and/or of a human or animal mammalian organ, in the first place at least one nucleic acid encoding a fusion protein, with the fusion protein containing a wild-type IL-15 and an Fc fragment, and/or at least one vector containing at least one said nucleic acid, in particular as claimed in one of
10 claims 8-13, and, in the second place, at least one suitable differentiation marker gene,
- b. differentiating the cell from step a.,
- 15 c. selecting the differentiated cell from step b., and
- d. introducing the selected cell from step c. into a human or animal organospecific tissue and/or into
20 a human or animal mammalian organ.
31. The process as claimed in claim 30, characterized in that at least one suitable transfection marker gene is introduced after, before, or at the same
25 time as, step a. and the transfected cell from step a. is preferably selected after step a.
32. The process as claimed in claim 30 or 31, characterized in that the cell is a pluripotent or
30 multipotent embryonic, fetal, neonatal or adult stem cell.
33. A process for producing transgenic nonhuman mammals as claimed in claim 22, comprising the
35 following steps:

- 5 a. Introducing, into at least one oocyte, one stem cell, one precursor cell and/or one immortalized cell of a nonhuman mammal, on the one hand at least one nucleic acid, in particular as claimed in one of claims 8-13, encoding a fusion protein and/or at least one vector, in particular as claimed in claim 15, containing at least one said nucleic acid, with the fusion protein containing a wild-type IL-15 and an Fc fragment, and, on the other hand, at least one suitable transfection marker gene,
- 10 b. selecting the transfected cell from step a.,
- 15 c. introducing the cell, which has been selected in accordance with step b., into at least one nonhuman mammalian blastocyte,
- 20 d. introducing the blastocyte from step c. into a nonhuman mammalian foster mother, and
- e. identifying the transgenic nonhuman mammal which has developed from said blastocyte.
- 25 34. The process as claimed in claim 33, characterized in that the cell is a pluripotent or multipotent embryonic, fetal, neonatal or adult stem cell.
- 30 35. A transgenic nonhuman mammal, characterized in that it was produced using the process as claimed in claim 33 or 34.
- 35 36. A transgenic nonhuman mammal, characterized in that it is an offspring of the mammal as claimed in claim 35.
37. The use of a transgenic nonhuman mammal as claimed

in at least one of claims 22, 35 and 36 for obtaining a cell, an organospecific tissue and/or a mammalian organ for allotransplantation and/or xenotransplantation.

5

38. The use of a transgenic nonhuman mammal as claimed in one of claims 22, 35 and 36, or of a human or animal organospecific tissue and/or of a human or animal mammalian organ as claimed in claim 21 for finding pharmacologically active compounds and/or identifying toxic substances.

10